Kodak digital science™

CD Library 144

User's Guide

A-65004

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Safety and regulatory information

Important Safety and Regulatory Information

WARNING: ***TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE UNIT TO RAIN OR MOISTURE.***

TO PREVENT POSSIBILITY OF INJURY OR DAMAGE TO THE UNIT, DO NOT OPERATE WITH ANY COVERS OR PANELS REMOVED.

CHANGES OR MODIFICATIONS MADE TO THIS PRODUCT WITHOUT EXPRESS APPROVAL FROM EASTMAN KODAK COMPANY COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

- **Read and follow instructions** — Read and follow all the safety and operating instructions before operating the unit. Heed all warnings on the equipment and in the operating instructions.
- **Power sources** — The unit should be operated only from the type of power source indicated on the dataplate label. If you are not sure of the type of power supply that will be used, consult a dealer or local power company.
- **Power cord damage** — Avoid damage to the power cord. If damage should occur, replace it with the specific cord for this unit.
- **Power cord protection** — Power supply cords should be routed so they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at plugs, convenience receptacles, and the point where they leave the unit.

  NOTE: The power cord must have appropriate Safety Agency approval for the country where the unit is installed.

- **Cleaning** — Unplug the unit before cleaning. Clean only the outside cabinets using a damp cloth. Do not use liquid cleaners or aerosol cleaners.
- **Attachments** — Do not use attachments which are not recommended. The use of unrecommended attachments may cause hazards and serious damage to the equipment.
- **Dust** — Excessive dust levels may damage internal parts.
- **Ventilation** — Slots and openings in the cabinets are provided for ventilation and to ensure reliable operation and protection from overheating. The openings should never be blocked or covered and the unit should never be placed near or over a radiator or heat register. Do not place the unit in a built-in installation unless proper ventilation is provided in accordance with the manufacturer's instructions.

- **Lightning** — For added protection for the equipment during a lightning storm, or any time when the equipment will be left unattended and unused for long periods of time, unplug the units from the power outlets. Unplugging the equipment will protect the equipment from damage caused by lightning or power line surges.
- **Overloading** — Do not overload power outlets and extension cords. This can result in a risk of fire or electric shock.
- **Object or liquid entry** — Never push objects of any kind into the equipment openings. They could touch dangerous voltage points or short-out parts and result in a fire or electric shock. Never spill liquid of any kind on the equipment.

CAUTION: Lithium Battery — Danger of explosion if battery powered RAM is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to manufacturer's instructions.

- **Laser safety** — See label below:

CLASS 1 LASER PRODUCT ACCORDING TO IEC 825.
PRODOTTO LASER DI CLASSE UNO SECONDO IEC 825.
KLASSE 1 LASER-PRODUKT ENTSPRECHEND IEC 825.
APPAREIL A RAYONNEMENT LASER DE CLASSE 1.
PRODUTO LASER CLASSE UM, CONFORME NORMA ICC 825.
1. LUOKAN LASERTUOTE, LUOKITUS IEC 825.
"PRODUCTO LASER TIPO UNO", SEGUN NORMATIVA 825 DE LA C.E.I.
KLASSE 1 LASER I.H.T. IEC 825
LASER KLASSE 1 I.H.T. IEC 825.
KLASSE 1 LASER CONFORM IEC 825
KLASS 1 LASER ENLIGT IEC 825.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Safety and EMC information

Declaration of conformity

We declare our sole responsibility that the product ***Kodak Digital Science*** **CD Library 144** to which this declaration relates, is in conformity with the following standards and bears therefore a CE mark:

- EN 55022 ClassB/1994
- EN 61000-3-2/1995
- EN 61000-3-3/1995
- EN 50082-1/1992
- EN 90950/1993

following the provisions of the applicable directives:

- 89/336/EEC and amendments
- 73/23/EEC and amendments

Safety standards

The *Kodak Digital Science* CD Library 144 complies with DHHS Regulations 21CFR Chapter I Subchapter J Section 1040.10.

The CD Library 144 is in conformity with international safety requirements and bears the following safety marks:

- UL (Underwriter Laboratories, UL 1950)
- CSA (Underwriter Laboratories test for Canadian Standards Association, CSA, 22.2 No. 950)
- GS (TÜV Rheinland, EN 60950) and EN 60825 (IEC825)

EMC standards

Europe

EN 55022:94 Class B emissions
EN 61000-3-2 Harmonics
EN 61000-3-3 Flicker

EN 50082-1:92 Generic Immunity
IEC 801-2
IEC 801-3
IEC 801-4

Pacific Rim Region:

VCCI (Japan, Class 2)
MITI Powerline Requirement Div. 6, No. 378
AS/NZS 3548 (Aus/New Zea. Class B)
AS/NZS 4251 (Aus/New Zea.)

American Region:

47 CFR part 15 support (FCC Class B), meets Class B limits for verification
ICES-003 Issue 2 Rev 1 (Canada, Class B)

Canadian interference-causing equipment regulations

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil nemérique de la classe B respecte toutes les exigences du Réglement sur le matérial brouilleur du Canada.

Class B ITE

Translation

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this unit is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by on or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1 Introduction

This Operator's Manual contains information that will help you set up and use the *Kodak Digital Science™* CD Library 144. You do not need any specialized computer knowledge to operate the CD Library 144.

About this manual

The CD Library 144 accepts both CD-ROM (Read-Only Memory) and CD-R (Recordable) Drives. In this manual they are referred to collectively as **drives** unless there is a need to differentiate between the two types.

Product description

The CD Library 144 can store up to 162 CDs in 9 magazines, each containing 18 discs each. You may install up to four CD-ROM or CD-R drives, in any combination. See the section in this chapter entitled, "Configuration options".

Drives and magazines fit interchangeably in the storage bays. However, drives may only be installed in the bottom four storage bays, starting at the lowest bay.

You may use any 120mm CD-ROM or CD-R media. For optimum performance and data retention when recording to CDs, *Kodak* CD-Writable media is recommended.

CDs can be bulk-loaded in magazines or individually loaded through the mailbox.

Store up to 162 CDs in 9, 18-disc magazines

Your choice of any combination of up to four CD-ROM or CD-R drives

The CD Library 144

The CD Library 144 is developed, manufactured, and serviced by Eastman Kodak Company.

Device Communications

The CD Library 144 robotics and drives are controlled over a single-ended Small Computer System Interface (SCSI-2).

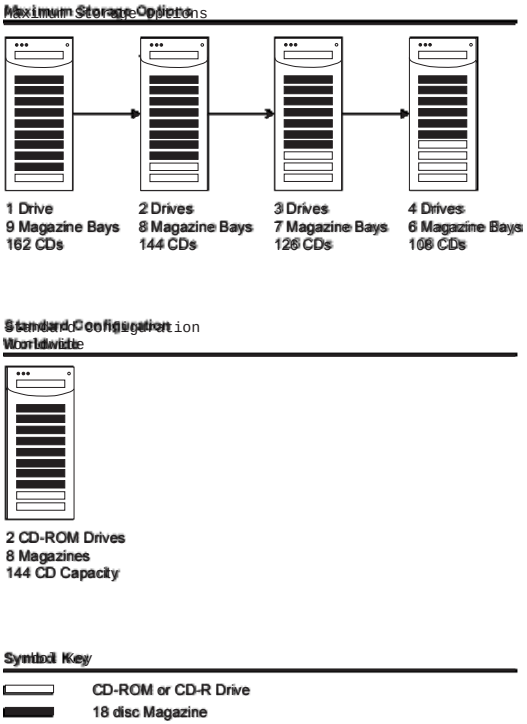
Configuring your CD Library 144

The following figure illustrates the configuration options for the CD Library 144.

Standard CD Library 144 configurations are shipped with the drives installed. You may purchase additional drives at any time and install them yourself. For instructions on how to install drives, see the section entitled “Drive installation” in Chapter 8.

Magazines are packed separately from the CD Library 144 and must be installed by the customer. Each magazine can hold up to 18 CDs. You may purchase and install additional magazines at any time.

CD media is not included with the CD Library 144. It must be purchased separately.



Configuration options

Catalog numbers

The table below lists the *Kodak Digital Science* CD Library 144 products with their catalog numbers.

Product Name	Catalog Number
CD Library 144 / Americas	864 7240
CD Library 144 / EAMER	818 8880
CD Library 144 / APR	172 9185
CD Library 144 / Japan	155 6984
CD Library 144 with 8 Magazines and 2 16X CD ROM Drives / Americas	831 4148
CD Library 144 with 8 Magazines and 2 16X CD ROM Drives / EAMER	115 8443
CD Library 144 with 8 Magazines and 2 16X CD ROM Drives / APR	131 3014
CD Library 144 with 8 Magazines and 2 16X CD ROM Drives / Japan	153 2647
CD Library Customer Installable 16X CD-ROM Drive	812 2483
CD Library Customer Installable CD-R 4X / 12X Drive	159 4365
CD Library Factory Installed 16X CD ROM Drive	188 4402
CD Library Factory Installed CD-R 4X/12X Drive	146 9873
CD Library 18-Slot Magazine	158 9001
CD Library Bar Code Labels / #19-#255	135 3168

2 Product Information

This chapter contains technical information about the CD Library 144.

Specifications

Physical Characteristics

Size (W x H x D)	10.6 x 30.7 x 18.9 in. (270 x 780 x 480mm)
Weight, including magazines and discs	70.5 lb. (32 kg)

Technical Specifications

Maximum disc storage	162 CDs
Maximum data storage (650 MB/disc)	105 GB
Maximum magazine installation	9
Universal storage bays (drive or magazine)	3
Maximum number of drives CD-R CD-ROM	4
SCSI channels	2 (4, if drives are internally terminated)
Operating Voltage	100 — 240V
Rating Current	2.5 — 1.0A
Frequency	50 — 60Hz

Performance specifications

Disc Exchange Time

The CD Library 144 Disc Exchange Time is defined as the time necessary for the robotics to:

- pick a disc from a drive (robotics located at the drive, drive drawer open).
- move to a magazine and load the disc into the magazine tray.

CD Library 144 Disc Exchange Times

Maximum	5.0 seconds
Minimum	3.7 seconds

Average Disc Load Times

Method	Average Load Time
Mailbox — Individual load	15 sec./disc
Magazine — 18 discs/magazine	30 sec./magazine

Reliability

Mean Time Between Failure (MTBF) CD Library 144	>20,000 POH (Power on Hours)
Mean Exchanges Between Failures (MEBF) Robotics CD-ROM Drives CD-R Drives Mailbox Magazine Tray	 >2,000,000 >100,000 >75,000 >20,000 >60,000

Environmental specifications

Condition	Operating	Non-operating	Shipping
Temperature Range	41° to 104° F (5° to 40° C)	14° to 149° F -10° to 65° C	-40° to 149° F (-40° to 65° C)
Gradient	52° F/Hr (11° C/Hr)	68° F/Hr (20° C/Hr)	68° F/Hr (20° C/Hr)
Relative Humidity (Non-condensing)	3% to 90%	5% to 95%	5% to 95%
Altitude	-1000 to 7000 ft.		
Shock	2Gs @ 11ms half-sine horizontal 1g @ 11ms half-sine vertical axis	50Gs @ 11ms half-sine and 1 pulse. No damage	
Vibration	5-17Hz 0.44mm p-p 17-150Hz 0.25G 0-p 150-200Hz linear interpolation 200-500Hz 0.33G 0-p	5-500Hz, 5mm 1G p-p No damage	10-20Hz, 2mm p-p
Tilt	+/- 5°		

Power cables

The power connector on the rear panel of the CD Library 144 complies with IEC 320. The connector on the library end of the power cable must comply with (IEC) EN 60 320/ C13.

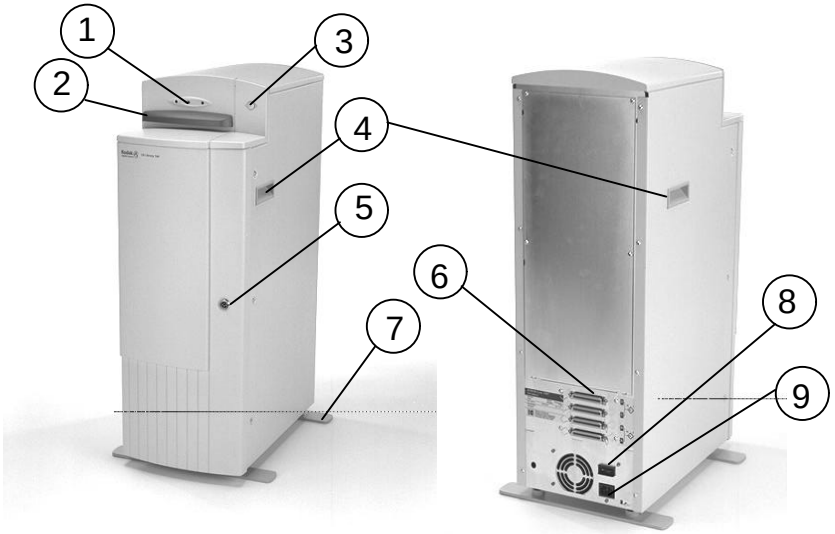
Depending on your location, the following power cable is provided with the CD Library 144:

Region	Part No.	Catalog No.
Australia	621 7861	719 3253
Europe Standard	451 3990	719 3204
France/Italy	600 4060	719 3238
Switzerland	603 7200	719 3220
UK	621 7851	719 3246
US/ Mexico/Canada	605 1531	719 3261
Asia/ Pacific Region (APR)	Customer provides power cable	
Greater China	Customer provides power cable	

3 CD Library 144 Features

Exterior

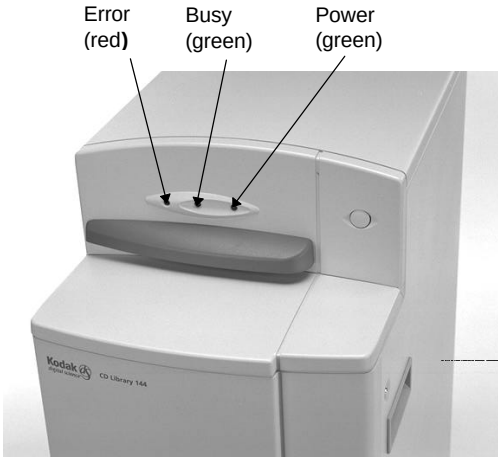
This chapter describes the operating features of the CD Library 144.



Exterior features of the CD library 144

1. Indicator lights
2. Mailbox
3. Open/close button, mailbox
4. Handles
5. Front door with lock
6. SCSI connectors
7. Stabilizing feet
8. Power switch
9. Power connector

Indicator lights — there are three indicator lights on the front of the CD Library 144. See the section entitled, “Indicator light status” in Chapter 9, for an explanation of the lights. From left to right they are:



Mailbox — The mailbox is used for loading and unloading individual CDs.

CAUTION: Do NOT use the mailbox drawer to lift or move the CD Library 144! Doing so can damage the drawer and drawer load mechanism.

Open/Close Button, Mailbox — press this button to open or close the mailbox.

Handles — the handles are used for lifting or moving the CD Library 144.

Front door with lock — the front door is unlocked and opened with the key provided. The front door allows access to the interior of the CD Library 144. You need to unlock and open the front door to install or remove magazines and drives, and to set or change SCSI IDs.

For firmware versions greater than 1.4.1 — the front door lock can be controlled via the host computer. If the host-controlled lock is enabled, access through the front door is not possible when the unit is powered on, even with a key. If the host-controlled lock is disabled, access through the front door is as described above. The default for the host-controlled door lock is disabled. Consult your CD server software documentation for more information.

When the front door is opened, an interlock switch disables the robotics after the CD Library 144 completes any tray or drawer operation in progress. Drive operations are not disabled.

Front Door Key — two identical keys are provided with the CD Library 144. If you require a replacement key, contact your reseller.

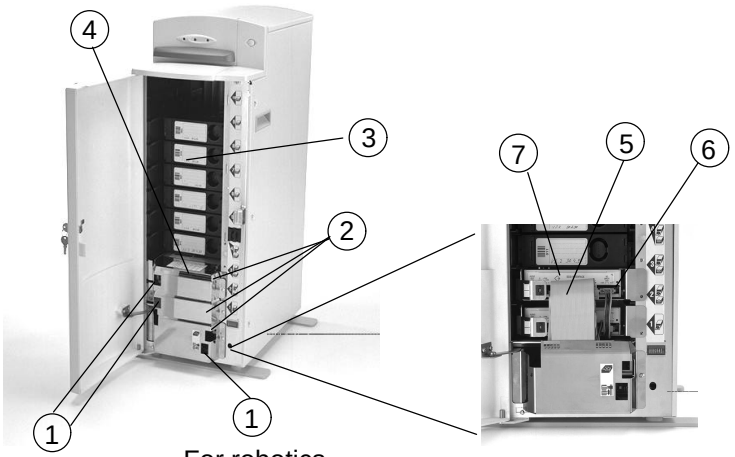
SCSI Connectors — the four SCSI connectors, labeled A - D, provide SCSI connections to the CD Library 144 from the host computer

Stabilizing feet — the feet provide stability to the CD Library 144 during operation.

Power switch — the power switch turns the CD Library 144 on and off

Power connector — the power connector provides AC inlet power to the CD Library 144.

Interior



Interior features of the CD Library 144

1. SCSI ID switches
2. EMI shields
3. Magazine bay
4. Configuration label
5. SCSI harnesses
6. Power harness
7. Drives

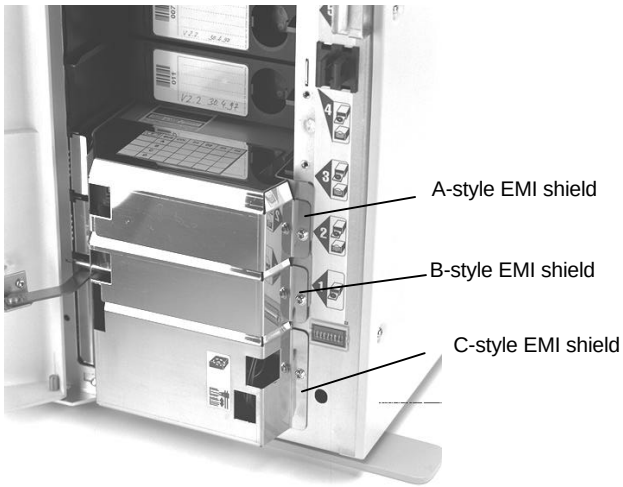
SCSI ID switches — there is a SCSI ID switch for each of the installed drives and one for the CD Library 144 robotics. Each device on a SCSI bus must be assigned a unique SCSI ID.

All SCSI ID switches are identical and each has two push buttons. To increase the SCSI ID number, press the bottom button. To decrease the SCSI ID number, press the top button.

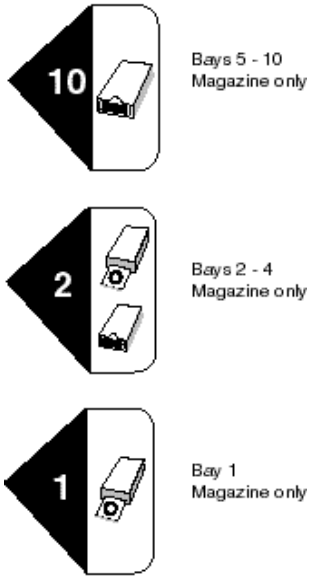
EMI shields — the library robotics and each drive are provided with an ElectroMagnetic Interference (EMI) shield. The EMI shields control electromagnetic transmissions or emissions that could interfere with the operation of the drives or the CD Library 144.

There are three styles of EMI shields:

- A-Style EMI shield — installed on the top or last drive in the CD Library 144.
- B-Style EMI shield — installed on all drives except the top one and included with each CD Library customer-installable drive.
- C-Style EMI shield — installed over the library robotics and electronics.



Drive/Magazine bays — there are 10 Drive/Magazine bays. Each bay is identified with one of three labels that indicates what may be installed in that bay, as illustrated below:

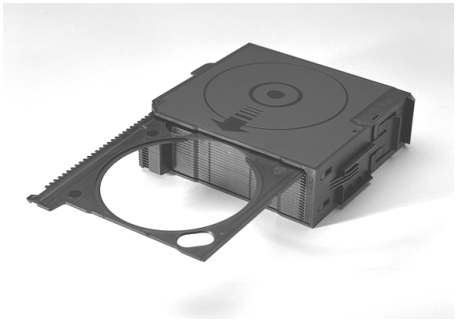


Configuration label — the configuration label is affixed to the A-style EMI shield and indicates how the SCSI devices in the CD Library 144 are configured. This label should be updated if drives are added or if the SCSI configuration changes. See the section entitled, “Configuration label” in Chapter 7 for instructions on filling out the label.

SCSI harnesses — the CD Library 144 supplies four pre-installed SCSI harnesses for connecting the library robotics and drives. See the section entitle “SCSI cabling and configuration” in Chapter 7 for details on the SCSI harnesses.

Drive power harness — the power harness has four power connectors, one for each drive position.

4 Magazines



Kodak Digital Science CD Library 18-Slot Magazines enable you to bulk-load CDs into the CD Library 144. Each magazine contains 18 slide-out trays. Each tray holds one CD. You may purchase additional CD Library 18-Slot Magazines at any time. Contact your sales representative.

You can manually load CDs into the magazine trays before you install the magazine in the CD Library 144. Or, empty magazines can be installed in the CD Library 144. If empty magazines are installed, the CDs must be loaded individually through the mailbox and put into the magazine trays, or a drive drawer, through a command from the host software.

This chapter describes how to:

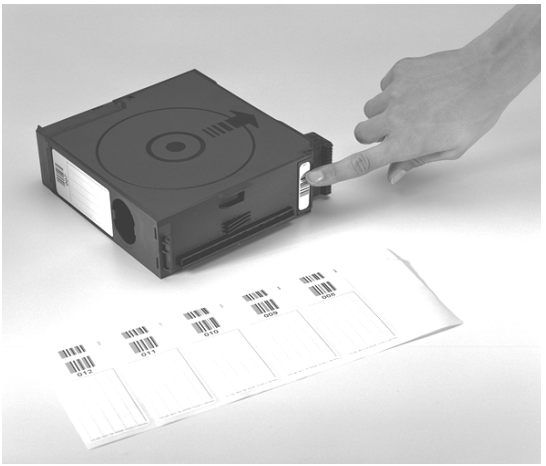
- apply bar code labels to magazines
- manually load CDs into the magazine trays
- install a magazine in the CD Library 144

Applying bar code labels

Magazine bar code labels #1 - 18 are shipped with the CD Library 144. They are provided in sheets of six sets of labels per sheet (two labels per set), and are packed with the manuals and other labels. To order additional bar code labels, contact your reseller.

Apply the bar code labels to the magazine before you install it in the CD Library 144. The bar code labels allow the CD Library 144 to identify the magazine during the inventory process.

To apply the bar code labels, peel the labels from the sheet and apply to the magazine in the locations noted below. Be sure to apply the labels in the same orientation as illustrated.



Applying Bar Code Labels

Loading CDs in magazine trays

To manually load CDs in the magazine trays:

1. Press the plastic spring on the side of the magazine to unlock the trays, and slide a tray out just far enough to clear the disc area.

   NOTE: Do **not** pull the tray completely out of the magazine. If this happens, the tray must be replaced in its original orientation in the magazine.

Step 1

Step 2

Loading a CD in the Magazine Tray

2. Place a CD, label side up, in the tray. Make sure the CD sits flat in the disc area.
3. Press the spring and slide the tray and CD all the way into the magazine.

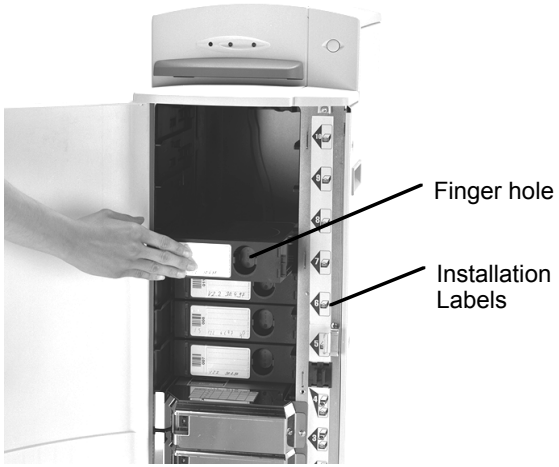
Installing magazines in the CD Library

You can add magazines to the CD Library 144 or change the position of existing magazines at any time. No tools are necessary for this procedure.

NOTE: During the initial set up of the CD Library 144, you must attach the stabilizing feet before installing the magazines (see Chapter 5).

1. Unlock and open the CD Library 144 front door.
2. Determine which bay you wish to use for the magazine. The label on the right side of each bay indicates whether a drive, a magazine, or either, may be installed.
3. Make sure the arrow on the top of the magazine is pointing into the library. Firmly, but carefully, slide the magazine into the bay slot until it clicks into place.

CAUTION: Do not use force to push the magazine into the bay slot. Damage to the magazine or your media could result.



Installing a Magazine

4. Close and lock the CD Library 144 front door.

Removing magazines

You can remove magazines to the CD Library 144 or change the position of existing magazines at any time. No tools are necessary for this procedure.

Changing magazines while powered up

You may install or remove magazines while the CD Library 144 is powered up. When you close the front door after installing or removing magazines, the library performs a partial automatic inventory. The inventory records the absence or presence of a CD in the magazines that were changed or added while the door was open. The inventory will take about 30 seconds per changed magazine.

NOTE: Opening the front door and changing magazines does not affect drive operations. Any current reading or writing processes will continue while the door is open.

5 Setting up the CD Library 144

Follow the instructions in this chapter to prepare the CD Library 144 for operation. The only tool you need for these activities is a flat blade screwdriver.

Packaging contents

The packaging carton contains the following items:

- CD Library 144 stabilizing feet
- Clear plastic bag containing:
  - — Power cable (except in Asia/Pacific Region and Greater China)
  - — External SCSI terminator connector (male)
  - — Front door keys (2)
- Clear plastic bag containing:
  - — CD Library 144 Operator's Manual
  - — User's Manual for each type of installed drive
  - — Bar code labels, #1 - 18
  - — Configuration labels (2)
  - — Interactive CD — Kodak Business Information Systems Products

Unpacking the library

Retain the packing material in which the CD Library 144 was shipped. You will need it when moving or shipping the unit.

CAUTION: Do NOT use the mailbox drawer to lift the CD Library 144! Doing so can damage the drawer and drawer mechanism.

Do **NOT** remove the red retainer strap from the mailbox until after the stabilizing feet have been installed.

Installing the stabilizing feet

The stabilizing feet must be installed to ensure stability of the CD Library 144. You need a flat head screwdriver to install the stabilizing feet on the bottom of the CD Library 144.

NOTE: Do **NOT** remove the red retainer strap from the mailbox until after the stabilizing feet have been installed.

Installation procedure

1. Remove all magazines from the CD Library 144, if any are installed.
2. Place a non-abrasive pad, such as the foam packing material from the shipping carton, on a stable work surface or the floor. The pad will prevent damage to the SCSI connectors and other features on the rear panel of the CD Library 144.
3. Carefully tip the CD Library 144 and lay it on the prepared surface, with the rear panel facing down.
4. Remove the four rubber pads from the bottom of the CD Library 144 by removing the screw that holds each rubber pad. Save the screws.

5. Install the stabilizing feet on the bottom of the CD Library 144. Use the four screws removed in Step 4.

Installing the Stabilizing Feet

6. Carefully return the CD Library 144 to an upright position.
7. Remove the red retainer strap from the mailbox by withdrawing the tab from the slot and pulling the strap carefully out of the mailbox. The retainer strap keeps the mailbox tray in place during shipping. It must be removed before the CD Library 144 is powered up.

NOTE: Keep the retainer strap with the other CD Library 144 packing materials. It must be reinstalled if the unit is moved or shipped. See the section entitled “Packing/Shipping” in Chapter 6 for reinstallation instructions.

8. Install magazines. See the section entitled, “Installing magazines in the CD Library 144” in Chapter 4.

Connecting the power cable

Plug the power cable into the power connector on the rear panel of the CD Library 144.

6 Operating the CD Library 144

This chapter contains operating instructions for the CD Library 144.

Powering up/powering down

Before powering up the CD Library 144, connect the power cable and SCSI cables, and ensure the last device on each SCSI bus is properly formatted.

NOTE: Before you power up the CD Library 144 for the first time after unpacking, remove the red retainer strap from the mailbox if you have not already done so. The retainer strap keeps the mailbox tray in place during shipping. If the retainer strap is still in place when the CD Library 144 is powered up, the automatic inventory will not succeed and damage to the mailbox may result.

Power the CD Library 144 up and down with the power switch on the rear panel.

Power up procedure

Turn the power switch to On.

- The CD Library 144 will perform the automatic inventory. During the automatic inventory, all three indicator lights will flash intermittently.
- When the inventory is complete and the CD Library 144 is successfully powered up, the green Busy light and green Power light will be illuminated.

Automatic inventory

Each time the CD Library 144 is powered up, it performs an automatic inventory that records the absence or presence of a CD in each magazine tray, and in the mailbox.

It takes about 30 seconds for the CD Library 144 to inventory the CDs in one magazine. A CD Library 144 that is fully loaded with 9 magazines takes approximately 5 minutes to inventory.

Power down procedure

Turn the power switch to Off.

Installing media

CDs can be loaded into the CD Library 144 in two ways:

- Individual disc loading through the mailbox.
- Bulk magazine loading, 18 discs per magazine.

Mailbox loading

To load an individual CD into the CD Library 144:

1. Press the **Open/Close** button. The mailbox drawer opens.
2. Place the CD in the mailbox tray, label side up.

Loading a CD in the Mailbox

3. Press the **Open/Close** button. The mailbox drawer closes.

   Each time the mailbox drawer closes, the CD Library 144 robot inventories the mailbox, checking for the absence or presence of a CD in the tray.

   CAUTION: Always use the Open/Close button to close the mailbox drawer. Do not push on the drawer.

   NOTE: The CD Library 144 will not move the CD from the mailbox tray unless prompted to do so by the host software.

Magazine loading

To bulk load CDs into the CD Library 144, see the section entitled “Installing magazines in the CD Library 144” in Chapter 4.

Upgrading firmware

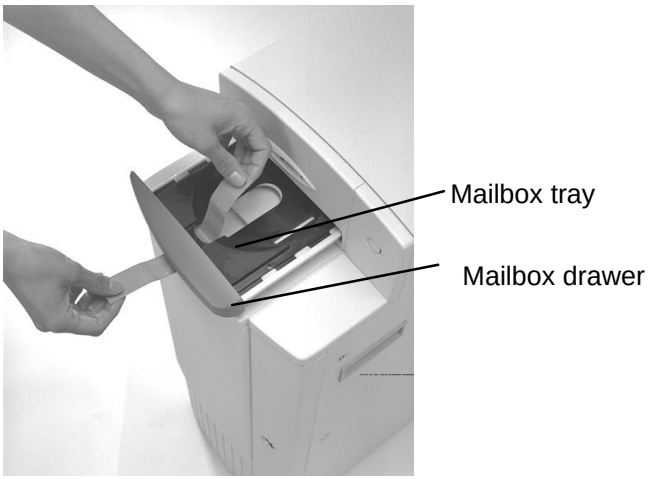
Firmware upgrades are provided through your reseller or upgrades may be downloaded from the Kodak Web site at: http://www.kodak.com

Packing/shipping

When moving or shipping the CD Library 144, use the original packing material in which it was delivered.

Preparing the CD Library 144 for shipping

1. **Remove all magazines from the library.** Drives may remain installed.
2. Install the mailbox retainer strap:
   - Power the unit on.
   - Unlock and open the front door.
   - Open the mailbox drawer.
   - Wrap the retainer strap around the front of the mailbox drawer, being sure to include the tray front. Secure the retainer strap by inserting the narrow tab end through the slot.



   - Close the mailbox drawer.
   - Power the unit off.

7 SCSI Cabling and Configuration

All CD Library 144 devices are connected through a single-ended SCSI-2 interface. The CD Library 144 devices include the library robotics and up to four drives.

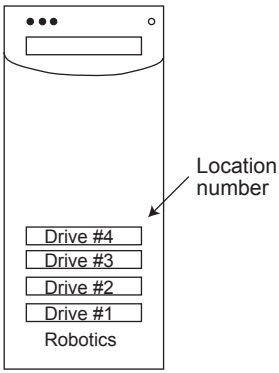
NOTE: There is no direct communication between the library robotics and the installed drives. All coordination between the library robotics and the drives is controlled by the host software.

Termination power

The CD Library 144 does not provide termination power (TERMPWR) to the SCSI bus. TERMPWR must be provided to the SCSI bus by either the host adapter or the drives. If TERMPWR is not provided, the CD Library 144 may report an error during power up.

SCSI IDs

As shown in the illustration below, each drive that is installed in a CD Library 144 is assigned a location number, and a recommended default SCSI ID. The CD Library 144 robotics are also assigned a factory default SCSI ID.



Device	Default SCSI ID
Drive #4	4
Drive #3	3
Drive #2	2
Drive #1	1
Robotics	5

CD Library 144 — Default SCSI IDs

Setting SCSI IDs

There is a SCSI ID switch on each of the installed drives and one for the CD Library 144 robotics. They are located inside the front door and are recessed behind the metal shields (EMI shields) mounted on the drives and robotics.

To set the SCSI ID, press the bottom push button to increase the SCSI ID number, and press the top button to decrease the SCSI ID number.

Setting SCSI ID switches

It is not necessary to remove the EMI shields to set the switches. The switch for the robotics is recessed slightly more than the switches for the drives, but may still be set or changed without removing the EMI shield.

Each device on a SCSI bus must have a unique SCSI ID.

The CD Library 144 does not support SCSI Configured Automatically (SCAM).

SCSI ID Bus length

CAUTION: When configuring your CD Library 144, it is critical to keep the total SCSI bus lengths within the limitations set by ANSI specifications. Using longer SCSI buses than specified can create data transfer malfunctions.

Use the following formula to determine the total SCSI bus length:

Total SCSI bus length = ANSI spec. recommendation =

Internal CD Library 144 length + External cable length + Internal host length

ANSI Specification

The table below lists the maximum allowable SCSI bus lengths as defined by ANSI specifications. The SCSI mode used depends on the host SCSI adapter.

SCSI Mode	Transfer Rate MB/sec.	Number of Devices	Maximum SCSI Bus Length
SCSI-2	5	8	19.7 ft. (6m)
	10	8	9.8 ft. (3m)
Fast 20	20	4	9.8 ft. (3m)
	40	8	4.9 ft. (1.5m)

Internal CD Library 144 Length

The table below lists the lengths of the internal SCSI harnesses installed in the CD Library 144. The Y-cable is included with each CD Library customer-installable drive, purchased separately.

Harness	Length
A	45.7 in. (1160 mm)
B	28 in. (710mm)
C	26.4 in. (670mm)
D	23.6 in. (600mm)
Y-Cable	11.8 in. (300mm)

Refer to the illustration *CD Library 144—SCSI Harnesses and Y-Cable, No Devices Installed* later in this chapter.

SCSI Cable Requirements

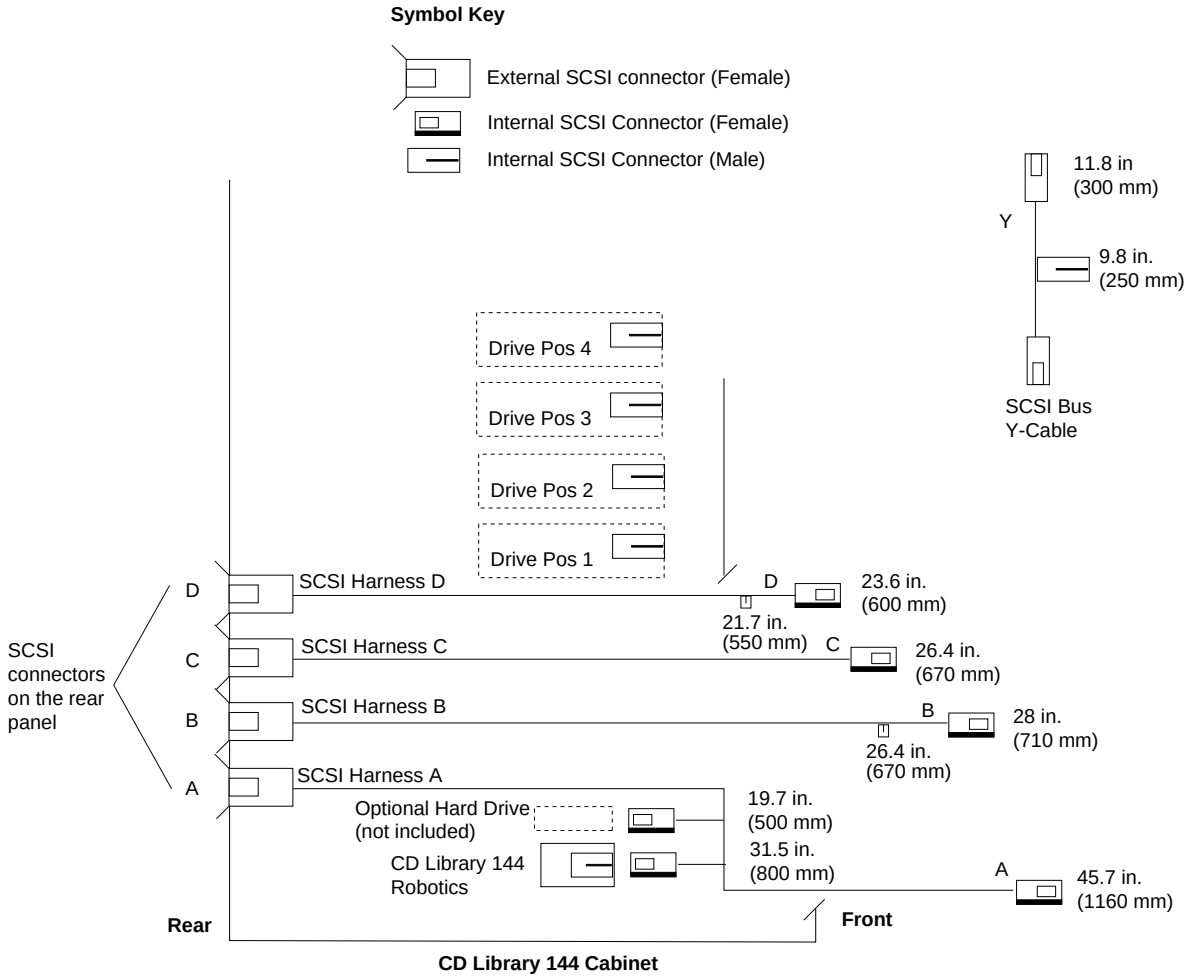
The external SCSI cable must be provided by the customer. A shielded single-ended cable with a 50-contact, low density SCSI device connector is required. The cable must comply with the SCSI-2 ANSI X3.131-1994.

When laying out the installation site, consider the routing of the I/O cabling. Avoid the following:

- Static discharges to the cables.
- Interference from noise sources such as fluorescent lights, motors, dimmer switches, power lines.

SCSI harnesses

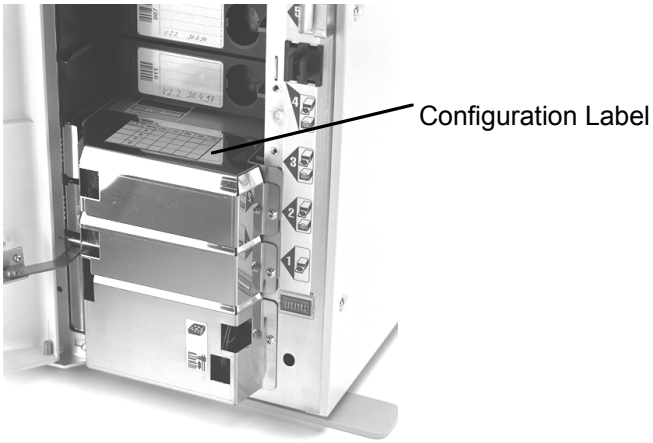
For flexibility in configuring your system, the CD Library 144 provides four installed SCSI harnesses. For ease of identification, the harnesses are labeled A - D, both at the connector on the rear panel and on the cable at the opposite connector end. Each CD Library customer-installable drive includes a Y-cable that can be used for connecting additional devices on a single SCSI bus.



CD Library 144—SCSI Harnesses and Y-Cable, No Devices Installed

Configuration label

The configuration label is affixed to the A-style EMI shield and indicates how the SCSI devices in your CD Library 144 are configured. To avoid confusion about how your CD Library 144 is configured, fill out or update the label any time drives are added or when the SCSI configuration changes.



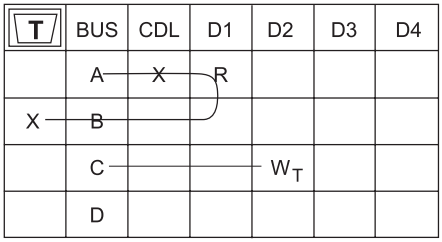
The Configuration Label

Additional configuration labels are supplied with the CD Library 144 and with the customer-installable drives. If necessary, apply a new label directly over the original and fill out appropriately.

Filling out the Configuration label

As illustrated below, indicate what devices are on each SCSI bus and where the bus is terminated. **Use R** to indicate a CD-ROM drive, and **W** to indicate a CD-R drive. Then, to define the bus, draw a line from the input SCSI connector (A, B, C, or D), through the connected devices, to the termination point.

In the example below, the library robotics and a CD-ROM drive (in drive position 1) are installed on the A-SCSI harness, with an external termination at the B connector on the rear panel. A CD-R drive (in drive position 2) is installed on the C-SCSI harness, with an internal termination at the drive.



Key:

T	termination (indicate external termination with X)
CDL	Library robotics
D1–D4	installed Drives 1 through 4
A–D	SCSI connectors A through D
R	D-ROM Drive (Reader)
W	CD-R Drive (Writer)
W_T, R_T	Drive w/internal termination

See the SCSI Device Configuration examples at the end of this chapter. Each example includes the appropriately filled out configuration label.

Cabling recommendations

To take full advantage of the flexibility of the CD Library 144 SCSI cabling architecture, we recommend the following:

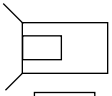
- Keep each SCSI bus as short as possible.
- The A harness must always be connected in the following way: first to the hard drive (if one is installed), then to the library robotics, then to successive devices if necessary.
- Always use the A harness connector as a SCSI input port.
- The A harness is the only harness provided that is long enough to connect to a device located in drive Position 4.
- Connect the A harness to the last, or top, drive installed. See the cabling examples that follow.
- Install drives in the four bottom-most installation bays, starting with drive Position 1. **Do not leave empty bays between drives.**
- Terminate the last device on the SCSI bus. Termination may be made internally or externally, depending on your configuration. An external SCSI terminator connector is provided with the CD Library 144. See drive documentation for procedures on how to terminate drives internally.
- To maximize performance and prevent CD-R drive errors, put each CD-R drive on a dedicated SCSI bus.
- Assign a unique SCSI ID to each device on a SCSI bus.
- Update the Configuration Label each time you add or remove drives or change the SCSI configuration.

SCSI device configuration examples

The following examples illustrate different drive installation configurations. Your configuration requirements may be different from what is shown.

The SCSI IDs are set as suggested by the CD Library 144 defaults.

Symbol Key for Configuration Examples


External SCSI connector (Female)

Internal SCSI Connector (Female)

Internal SCSI Connector (Male)

SCSI Terminator Connector (Female/Male), Internal

SCSI Terminator Connector (Male), External (provided)

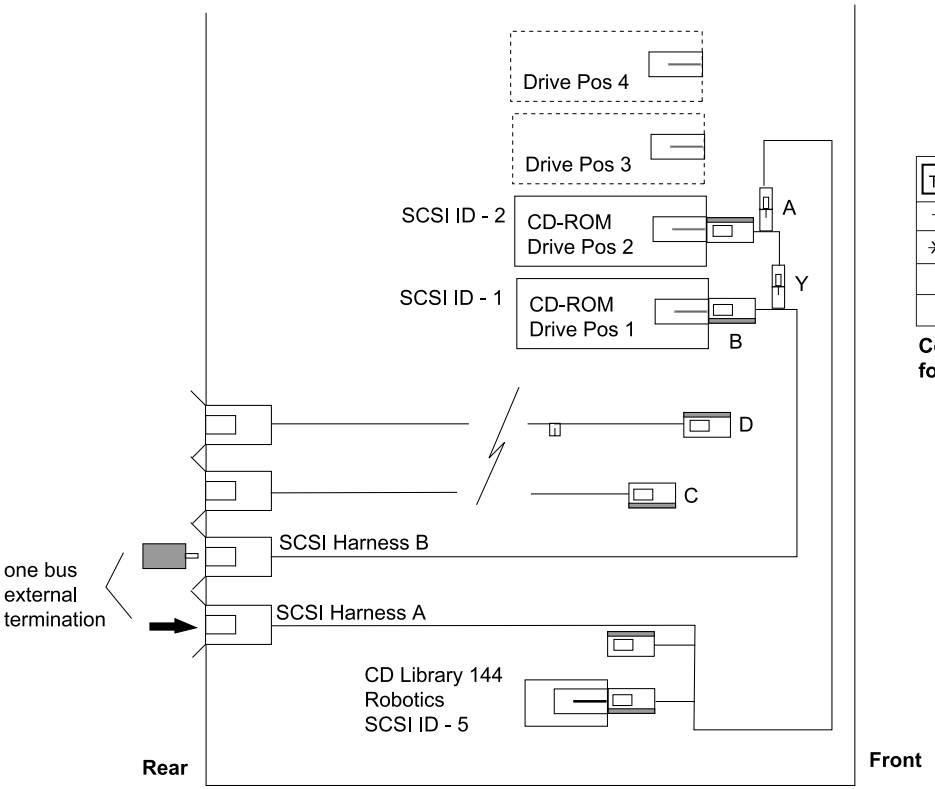
External SCSI Bus Input

Example 1 — standard configuration

Example 1 illustrates the standard SCSI configuration for the CD Library 144, which installs two CD-ROM drives and the library robotics on one SCSI bus.

The library robotics and the drives are connected on the same bus, with SCSI input on harness A. The interconnection between the drives is made with a Y-cable. The bus is terminated externally at the B connector on the rear panel. Harnesses C and D are not used here.

The total length of the internal SCSI cabling in this example is:
A + Y + B = 85.5 in. (2172mm)



CD Library 144 Cabinet

T	BUS	CDL	D1	D2	D3	D4
	~~A~~	~~X~~	~~R~~	~~R~~		
~~X~~	~~B~~					
	C					
	D					

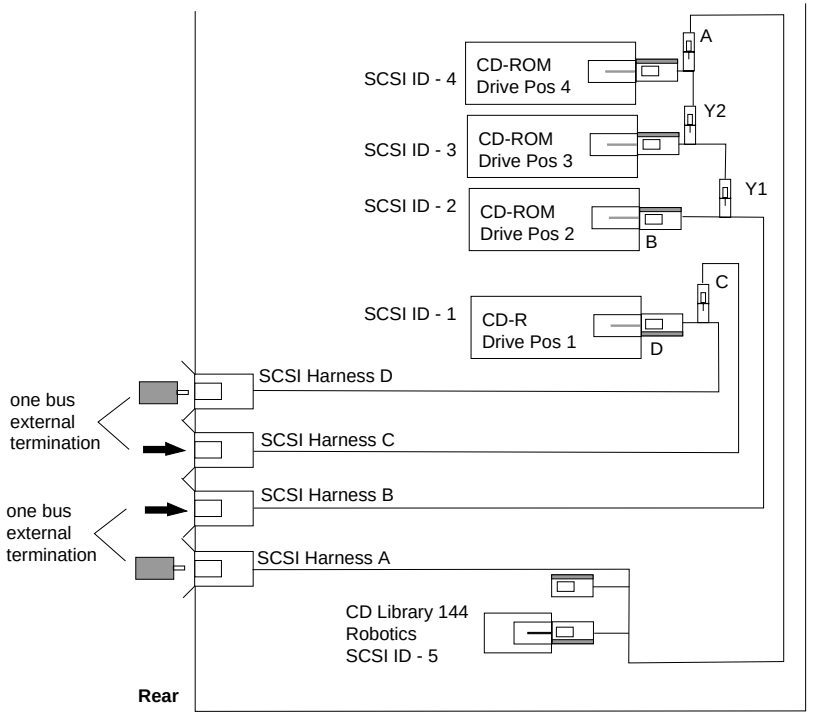
Configuration Label for Example 1

Example 2

Example 2 illustrates the installation of one CD-R drive on a dedicated SCSI bus, and three CD-ROM drives and the library robotics on another bus.

The CD-R drive is connected on a separate bus, with SCSI input on harness D. The bus is terminated externally at the C connector on the rear panel. The total length of the internal SCSI cabling on this bus is:
C + D = 50 in. (1270mm)

The library robotics and three CD-ROM drives are connected on the same bus, with SCSI input on harness A. Interconnections between the drives are made with Y-cables. The bus is terminated externally at the B connector on the rear panel. The total length of the internal SCSI cabling on this bus is:
A + Y2 + Y1 + B = 97.2 in. (2470mm)



CD Library 144 Cabinet

T	BUS	CDL	D1	D2	D3	D4
	A	X		R	R	R
X	B					
X	C					
	D		W			

Configuration Label for Example 2

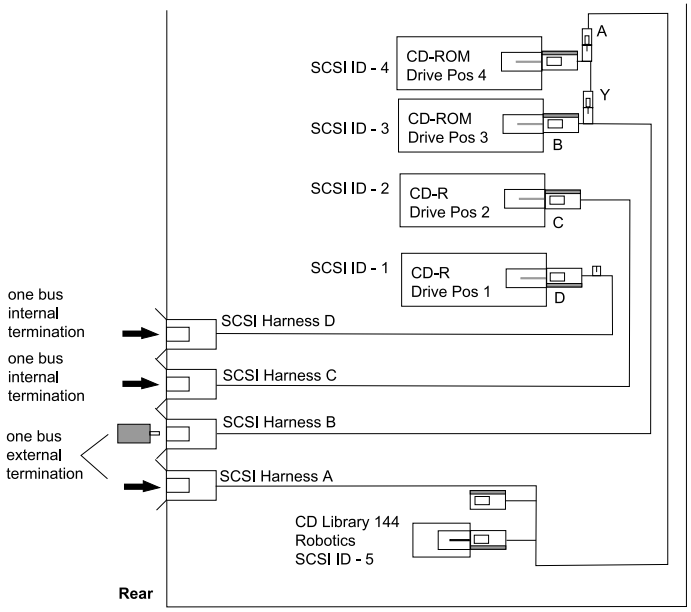
Example 3

Example 3 illustrates the installation of two CD-R drives, each connected on a dedicated SCSI bus; and two CD-ROM drives, which share a single SCSI bus with the library robotics.

SCSI input for the CD-R drive in drive position 1 is on harness D. The drive is terminated internally. See the drive documentation for information on terminating drives internally. The total length of the internal SCSI cabling on this bus is:
D = 23.6 in. (600mm)

SCSI input for the CD-R drive in drive position 2 is on harness C. The drive is terminated internally. The total length of the internal SCSI cabling on this bus is:
C = 26.4 in.(670mm)

The library robotics and two CD-ROM drives are connected on the same bus, with SCSI input on harness A. The interconnection between the drives is made with a Y-cable. The bus is terminated externally at the B connector on the rear panel. The total length of the internal SCSI cabling on this bus is:
A + Y + B = 85.5 in. (2172mm)



CD Library 144 Cabinet

T	BUS	CDL	D1	D2	D3	D4
	A	X			R	R
X	B					
	C			W_T		
	D		W_T			

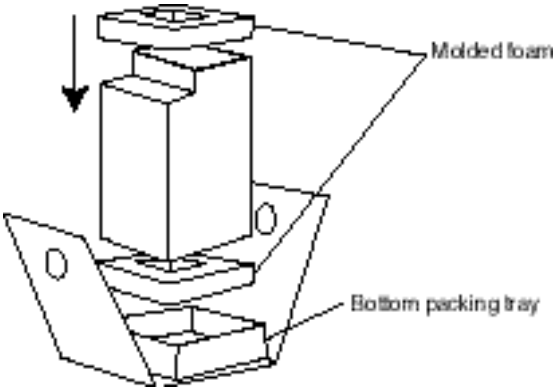
Configuration Label for Example 3

- Close and lock the front door.

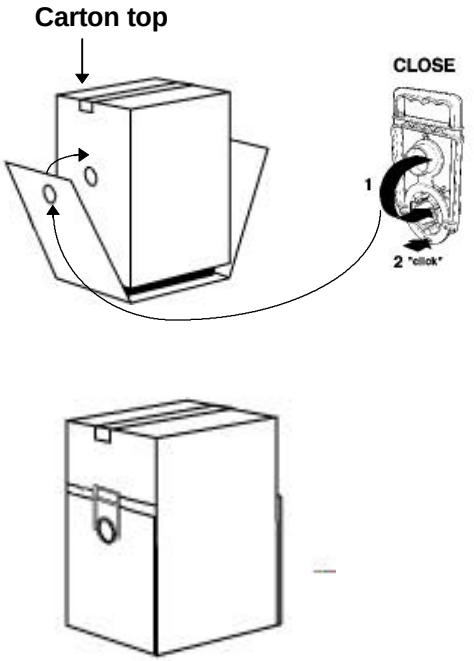
  NOTE: The mailbox drawer must be secured to prevent the tray from sliding out of the mailbox during shipping. If you do not have the original retainer strap, a strip of heavy weight paper may be substituted. Tape or staple the strip to secure.

3. **Unplug the power and SCSI cables from the rear panel**.
4. Remove the stabilizing feet.
   - Place a non-abrasive pad, such as the foam packing material from the shipping carton, on a stable work surface or the floor.
   - Carefully tip the CD Library 144 and lay it on the prepared surface, with the rear panel facing down.
   - Remove the stabilizing feet from the bottom of the CD Library 144 by removing the screws.
   - Carefully return the CD Library 144 to its upright position.

5. Pack the CD Library 144 in its original packing container. Make sure both the top and bottom pieces of molded foam packing material are in place before sliding the carton top over the unit.



6. Securely fasten the carton closed with the plastic handles, as illustrated below.



8 Drive Installation

You may purchase additional CD-ROM or CD-R drives for your CD Library 144. There are currently two drives available for field installation by the customer:

- *Kodak Digital Science* CD Library Customer Installable 16X CD-ROM Drive.
- *Kodak Digital Science* CD Library Customer Installable CD-R 4X/12X Drive.

Contact your reseller for the latest list of available drives.

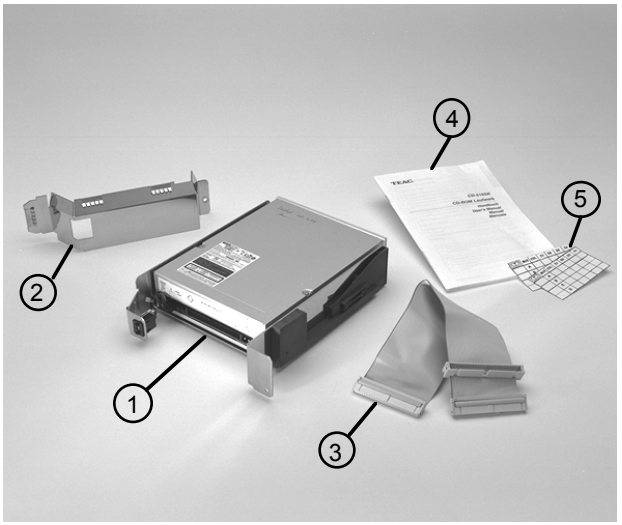
Most packaging, shipping, and installation procedures are the same for both types of drives. Therefore, they are collectively referred to here as **drives**, unless it is necessary to differentiate between the two types.

There may be slight differences in the SCSI configurations of a CD-R and a CD-ROM Drive.

IMPORTANT: *See Chapter 7, "SCSI Cabling and Configuration" for more information..*

This chapter describes the drive packaging contents and provides instructions for installing a drive into the CD Library 144.

Packaging contents



Contents of customer-installable drive package

1. Customer Installable Drive (with mounting brackets installed)
2. EMI shield, B style, with fastener
3. Y-Cable
4. User's Manual—Drive
5. Configuration label
6. Installation Instructions (not pictured)
7. *Kodak* CD Writable media (not pictured), with CD-R Drive only

Installation tools

The only tool you need to install a Customer Installable Drive in a CD Library 144 is a flat blade screwdriver.

EMI shields

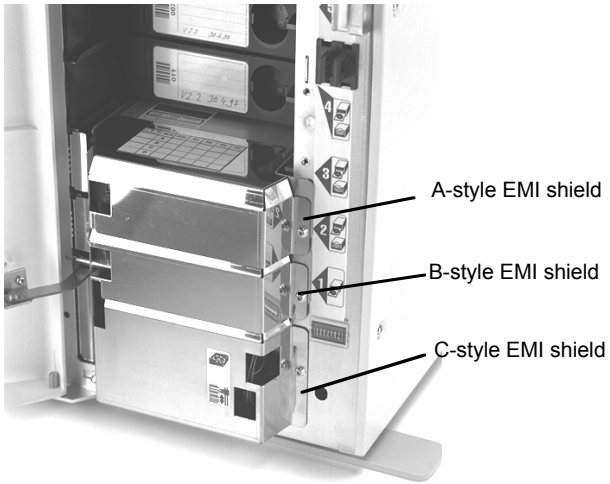
Each drive is provided with an EMI (ElectroMagnetic Interference) shield. The EMI shields protect the CD Library 144 from harmful electromagnetic transmissions and emissions.

CAUTION: To ensure EMI/EMS (EMS = ElectroMagnetic Susceptibility) protection, the EMI shields must be reinstalled after changing drives or modifying the drive harness.

There are three styles of EMI shields for the CD Library 144:

- The A-style shield is provided with the CD Library 144 and is always installed on the last or top, drive.
- B-style shields protect all other drives. One B-style shield is included with each Customer Installable Drive.

The C-style shield is provided with the CD Library 144 and protects the library robotics and electronics.



Three styles of EMI shields

Installing a drive

NOTE: A bar code label is installed on the Customer Installable Drive chassis. Do not change or remove this label.

Drive installation procedure

1. Power down the host computer, the CD Library 144, and all connected SCSI devices.
2. Unplug the power cable from the back of the CD Library 144.
3. Unlock and open the front door.
4. Remove the A-style EMI shield from the top drive in the library by removing the screw that secures the right side of the shield. Swing the shield open and remove the left side of the shield from the tab in the library frame.
5. Remove the remaining EMI shields in t he same manner, starting at the top and working down.

   NOTE: The screws that secure the EMI shields also secure the drive to the library frame. Be sure to retain the screws for reinstallation of the EMI shields.

Removing the A-Style EMI shield

6. If a magazine is installed in the bay directly above the top installed drive, remove it and re-install it in an empty bay. Drives may be installed in the four lowest bays only, starting with the bottom, with no empty bays between drives.

7. Hold the drive as illustrated below and firmly but carefully slide it into the bay slot until it clicks into place.

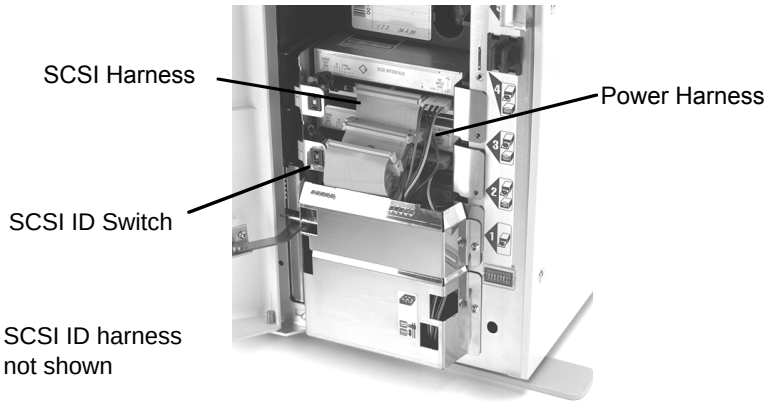
Installing a drive

The CD Library 144 comes equipped with two SCSI ID harnesses. (Early versions of the CD Library 144 do not have SCSI ID harnesses and this step should be disregarded for those units.) These harnesses connect the drives to the library control board and provide the capability for the library to communicate drive positions and drive SCSI IDs to the host. One end of the two harnesses connects to the robotics control board at the bottom of the library. Each opposite end consists of two connectors for connecting to the installed drives. One harness has connectors labeled 1 and 2 for installation to drives in positions one and two and the other have connectors labeled 3 and 4 for installation to drives in positions three and four.

8. There are four SCSI harnesses installed in the CD Library 144. Choose the appropriate harness and connect it to the SCSI connector on the back of the drive. You may need to use the Y-cable for the drive's SCSI bus connection, depending on your configuration. For SCSI cabling information and examples, see the section entitled, "SCSI cabling and configuration" in Chapter 7.

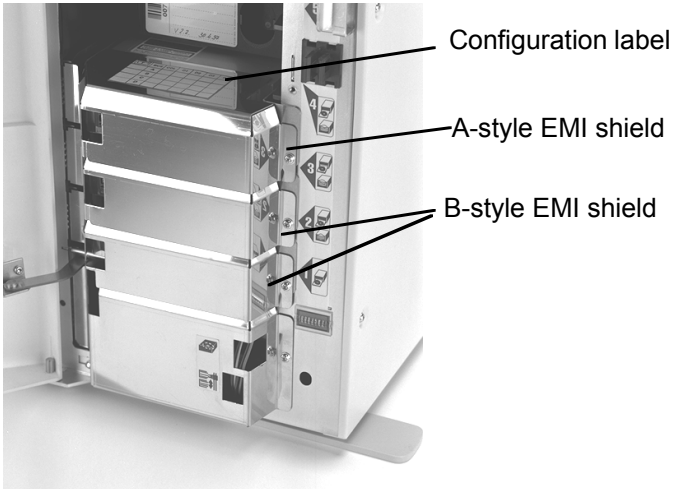
9. Terminate the SCSI bus appropriately. The last device on the SCSI bus must be terminated. Termination may be made internally or externally, depending on your configuration. See the diagram with Step 12 or the drive documentation for procedures on how to internally terminate drives.

10. The CD Library 144 provides four power connectors. Plug one of the power connectors into the back of the drive. Use any one of the available connectors.



Cable Harnesses

11. Re-install the bottom C-style EMI shield in its original lowest position. Working form the bottom up, install B-style, EMI shields over all drives except the top-most drive. Finally, install the A-style EMI shield over the top drawer.



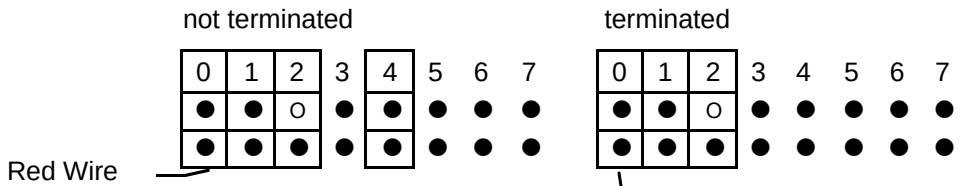
Drive and EMI Shields Installed

12. Set the drive SCSI ID switch, if necessary. See the section entitled, “Setting SCSI IDs” in Chapter 7 for system default IDs.

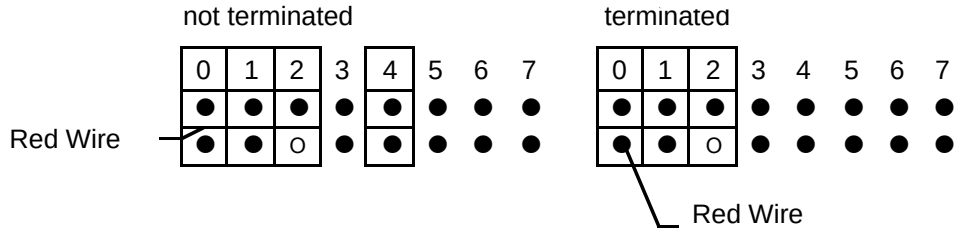
    Each device on a SCSI bus must be assigned a unique SCSI ID.

NOTE: Drives are shipped with the SCSI ID switch already connected to the back of the drives. Should this connection be inadvertently disconnected from the back of the drive, see the following diagram for proper reconnection.

Writer: Teac CD-R50S



CD-ROM: Teac CD-516S



13. Update the configuration label located on the A-style EMI shield. See the section entitled “Filling out the configuration label” in Chapter 7 for more information.
14. Close and lock the CD Library 144 front door.
15. Plug the power cable into the back of the CD Library 144.

9 Troubleshooting

If the actions suggested in this chapter do not succeed in solving your problem, or if you encounter problems not listed here, contact your Reseller or Service Provider.

Troubleshooting chart

The following table lists common problems that you may encounter with your CD Library 144, and the appropriate action to take.

Problem/Error	Probable Cause	Operator Action
Unit does not power up	Power cable not connected Power switch off	Plug in power cable Turn on power switch
Indicator lights do not illuminate	Power cable not connected Power switch off	Plug in power cable Turn on power switch
Error light is on or flashing, unit not responding	See the following table, *Indicator Light Status*	
Mailbox will not open	Power cable not connected Power switch off	Plug in power cable Turn on power switch
Automatic inventory does not complete	Mailbox retainer strap not removed	Remove retainer strap from mailbox drawer
Unable to retrieve documents, images, data	Application software error, Drive error	Reboot host computer
Unable to access CD Library 144 from host	SCSI bus incorrectly configured Application software error	Refer to Chapter 7, *SCSI cabling and configuration* Reboot host computer
Mechanical error, manual intervention required	Refer to *Mechanical Error Checklist* later in this section	
Unit not responding as expected, no error light	Refer to *Mechanical Error Checklist* later in this section	

Indicator light status

There are three indicator lights on the front of the CD Library 144. From left to right they are Error (red), Busy (green), and Power (green).

The following table describes the different states of the indicator lights, and the appropriate action to take if an error occurs.

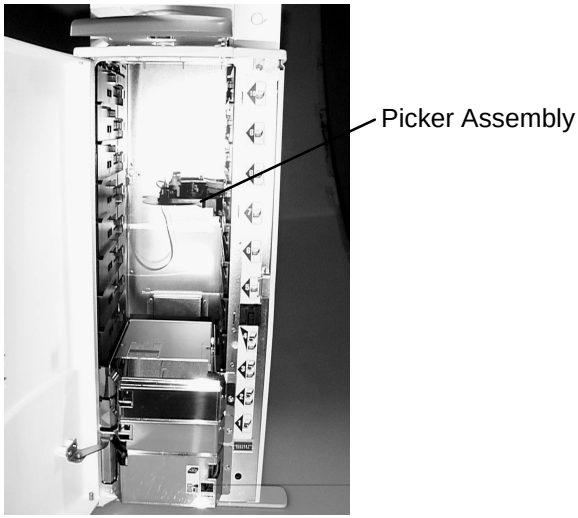
Indicator Light Status				
Error red	**Busy green**	**Power green**	**System Status**	**Operator Action**
off	off	off	Power off	No action necessary
off	on	on	System ready	No action necessary
off	flash	on	System busy	No action necessary
flash	off	on	System error	Power down unit, power back up
on	off	on	Firmware error or power up error	Power down unit, power back up. If unsuccessful, install new firmware. Refer to Chapter 5, *Upgrading Firmware.*
on	on	on	SCSI bus error	Power down unit, power back up. Check configuration, terminate SCSI bus. Refer to Chapter 5, SCSI *cabling and configuration.*
on	flash	on	Front door open	Close and lock front door
flash	flash	on	Power up error Blocked clear path sensor Mechanical error, manual intervention required	Power down unit, power back up. Refer to Chapter 9, *Mechanical error checklist*.

Mechanical error checklist

If a mechanical error occurs, perform the following checklist. It addresses the most common reasons for a mechanical error or jam.

- Close and lock the front door.
- Open the mailbox and check that the tray is fully seated.
- Close the mailbox.
- Power down the unit and unplug the power cable.
- Open the front door, remove all magazines, and check that all of the magazine trays are fully closed and seated.

With the magazines removed, locate the picker assembly, pictured below. It is located inside the unit, behind the magazine/drive bay area. It travels up and down on two shafts: one is round and spiraled, and the other is square. The shafts are mounted near the right hand, inside panel of the CD Library 144.

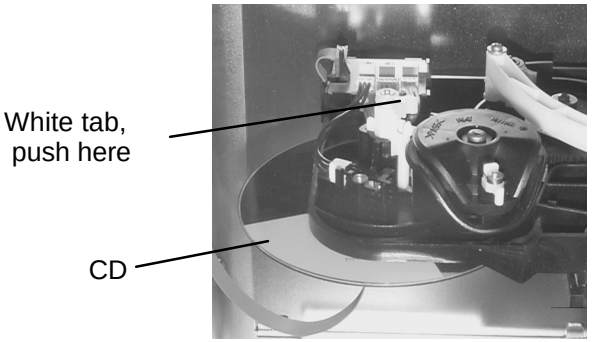


The Picker Assembly

- Move the picker up or down by manually rotating the spiraled shaft. Position the picker at or near magazine bay 8.

- If there is a CD being held by the picker, as in the picture below, release the CD by doing the following:

  — With your left hand, hold the CD lightly by the edges. With your right hand, push the white tab feature (see below) away from you. The picker releases the CD.



Releasing the CD

- Reinstall the magazines.
- Close and lock the front door of the CD Library 144.
- Plug in the power cable and power up the unit.
- If the original problem persists, contact your Reseller or Service Provider.

Warranty and Service Agreement

Important Warranty and Service Agreement Notice:

To avoid unnecessary down-time should your *Kodak Digital Science* CD Library 144 need service, it is important to register your Warranty as soon as possible. Contact your CD Library 144 Reseller to register your warranty and discuss your Service Agreement protection options. Be sure to have the Serial Number and K# of the CD Library 144 ready when you contact your Reseller.

EASTMAN KODAK COMPANY
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